

Metropolitan polytechnic. Finally, the president is desirous of following the lines adopted at Woolwich and Sandhurst, oblivious of the fact that these are military institutions and that Coopers Hill is a civil scientific College. The proper arrangement for the conduct of such a college as Coopers Hill is, in the opinion of Colonel Ottley, that there should be no inter-communication among the staff, but that each member of the staff should communicate alone with the president. The danger of this system of private conferences as leading to misrepresentation is exemplified by the case of Prof. Hearson, whose private consultations with the president are presented in such an extraordinary light by Colonel Ottley (Blue-book, p. 54). It is probably due to this that Prof. Hearson has been dismissed, though the reason adduced by the president was that Dr. Brightmore was debarred from teaching hydraulics, "his strongest subject," because that subject had been allotted to Prof. Hearson. There is, however, conclusive evidence that both professors were desirous of effecting an interchange of work by which hydraulics would have been handed over to Dr. Brightmore. This evidence the Board of Visitors ignore. Another result of this plan of separate conferences has been shown during the past year. The College has been divided into a series of separate camps. Tempted by the secret offers of the president, some of the junior members of the staff have consented to supplant their seniors for the modern equivalent of a mess of pottage, which appears, in this instance, to be something under 100*l.* a year.

The only charge against the College which appears in the report—and if any other existed we may feel sure the Board of Visitors would have set it forth—is that certain of the telegraph men have been found to be unsatisfactory, and that in some respects the telegraph branch might be improved. No fault of any kind is found with the training of the engineering students, who form by far the larger part of what is essentially an engineering college.

The criticisms on the telegraph men, of whom there are about three a year, is contained in Appendix 12 of the Report, pp. 131–146; and Mr. Pitman, who writes therein, expressly states that his "object is not to unduly criticise the course of instruction at the Coopers Hill College, *which has supplied the Department with so many excellent officers,*¹ but to bring to the notice of the responsible authorities that it would be possible to greatly improve the course of instruction and turn out officers with a greater knowledge of the theory and practice of Indian telegraphy than they can now obtain." This report, which is obviously intended, not as an adverse criticism, but as a friendly suggestion to the staff for improvement in details, expressly states that all the physical laboratory work (for which Mr. Shields is responsible) is excellent.

We have searched the Blue-book in vain for evidence that the Board of Visitors have tried to discover whether any of the suggestions made have been adopted, though Mr. Shields does manage to tell them that those referring to his part of the work have been adopted as far as time permits. And yet Mr. Shields is sent away. We happen to know that it was absolutely necessary for the Board to get rid of Mr. Shields because his successor had already been appointed! and because, moreover, Colonel Ottley had informed that successor, in the interval between the dates of the correspondence between Sir Wm. Anson and Lord George Hamilton (which was published in the daily papers) and the beginning of the inquiry, that whatever happened his appointment was secure! The bias of the Board is further shown by their conducting no inquiry into the admittedly excellent electro-technical course taken by Mr. Shields with some of the third year students.

¹ The italics are ours.

The defects of the telegraph students are not due to this or that part of the course being capable of slight improvement, for it is cordially admitted that many of them are excellent officers. The real reasons are given on pp. 121, 122. The calibre of some of the men during recent years has been exceptionally low, and owing to a variety of circumstances the abler men have not chosen to take telegraph appointments. This year, however, the standard is higher, and unless the break in their work, caused by the extraordinary plan adopted by the India Office of dismissing half the staff in the middle of the session, has too disastrous an effect on the students, they should take a high place in the service.

So far, therefore, from the indictment being justified that the College must be reformed or abolished, we can confidently assert that very few colleges, if subjected to such a hostile criticism as has been applied to Coopers Hill both by the president and by the Board, could show so clean a record.

A grave injustice has been done, not only to the seven gentlemen dismissed, but to all those whose services are "for the present" retained and to all who take part in the higher education of the country. The Board of Visitors have dropped their plea of economy because the changes have been shown not to be economical. They have dropped their plea of increased efficiency because it is impossible to maintain that to dismiss a man with Prof. Hearson's reputation and to replace him by a man of the reputation of Dr. Brightmore (who has not hesitated to inform the Board that he is unable to maintain discipline in his class) makes for efficiency. The Board of Visitors have, in fact, no plea to put forward for the action they have taken. They have relinquished their powers of judgment to a military autocrat who, backed up by other retired officials at the India Office, has absolute power over the destinies of the entire staff at Coopers Hill. Recent events in this country have not increased the faith of the people in the ability of either our public offices or of our army officers. Military methods have been shown to be imperfect and the scientific and educated opinion of the country will be slow to recognise the advisability of extending them to such institutions as the Engineering College at Coopers Hill.

NOTES.

As already announced, a meeting of the International Association of Academies will be opened at Paris on Tuesday next, April 16, in the rooms of the Institute of France. The following is a list of delegates appointed to represent the various academies which will constitute the Association:—Amsterdam: Prof. H. G. van de Sande Bakhuisen, president of the physico-mathematical section of the Academy; Prof. H. Kern, president of the section of letters; Prof. J. de Goeje. Berlin: Prof. H. Diels and Prof. W. Waldeyer, permanent secretaries of the Prussian Royal Academy of Sciences; Prof. R. Helmert; Prof. J. H. van 't Hoff; Prof. T. Mommsen; Prof. E. Sachau. Brussels: Lieut.-General de Tilly; Prof. P. Fredericq. Budapest: Prof. C. Than; Prof. I. Goldziher. Christiania, not yet announced. Göttingen: Dr. E. Ehlers and Dr. F. Leo, secretaries of the Society; Prof. E. Riecke. Copenhagen: Prof. J. L. Heiberg; General G. Zachariae. Leipzig: Prof. W. His; Prof. A. Fischer; Prof. H. Gelzer. London: Sir Michael Foster and Prof. A. W. Rucker, secretaries of the Royal Society; Dr. T. E. Thorpe, foreign secretary of the society; Sir Norman Lockyer; Sir Archibald Geikie; Prof. A. R. Forsyth; Prof. E. Ray Lankester; Prof. A. Schuster. Munich: Prof. W. Dyck; Prof. F. Lindemann; Prof. K. Krumbacher. Paris, Academy of Inscriptions and Belles Lettres: Count De Lasteyrie, president; MM. P. Berger, vice-president;

H. Wallon, permanent secretary; L. Delisle; G. Boissier; Breal; Barbier De Meynard; Scnart; E. Müntz. Academy of Sciences: MM. Fouqué, president; Bouquet de la Grye, vice-president; Berthelot and Darboux, permanent secretaries; Marey; H. Poincaré; Moissan; Lannelongue. Academy of Moral and Political Sciences: Count de Franqueville, president; G. Picot, permanent secretary; Gréard; Glasson; Lachelier; Sorel; Boutroux. St. Petersburg: MM. Famintzin; Backlund; Oldenbourg; Kouliabko. Rome: Prof. S. Cannizzaro; Prof. A. Mosso; Prof. I. Guidi. Stockholm: Prof. G. Retzius, president of the Academy of Sciences. Washington: Prof. G. L. Goodale. Vienna: Prof. Victor von Lang, general secretary of the Academy of Sciences; Prof. T. Gomperz; Prof. Leopold von Schroeder; Prof. J. Karabacek; Prof. J. C. Zirecek; Prof. A. Rollett; Prof. G. Tschermak.

MR. L. DE NICÉVILLE, who has for many years been well known by his published work on Indian and Malay Lepidoptera, has been appointed entomologist in the Indian Museum, Calcutta.

PROF. EUGEN WARMING AND DR. VICTOR MADSEN have been appointed to the Danish Geological Survey, and Dr. H. Topsøe has retired from the Survey.

THE death from cholera of Mr. G. F. Reader, of the Geological Survey of India, took place at Madras on March 12. Mr. Reader was appointed as a specialist in coal mining in 1899, and for the last five months of his life also officiated as Government mining inspector.

REUTER'S correspondent at Constantinople states that the sharp earthquake experienced there on March 30 occurred at five minutes past nine in the morning. The movements observed were in the direction from south-west to north-east and lasted nearly five seconds.

MR. W. B. TRIPP, writing from Isleworth, says that on April 4, about 10 p.m., a fine display was observed of lunar halo with horizontal ray on a level with moon and two paraselenæ (or mock moons) at its intersection with the halo, which remained all the evening while the paraselenæ soon disappeared.

THE subjects of the Walker prizes in natural history to be awarded by the Boston Society of Natural History, Massachusetts, U.S.A., are as follows:—For 1901: Monograph on any problem connected with, or any group belonging to, the North American fauna or flora; for 1902: (1) nuclear fusions in plants; (2) the fate of specific areas of the germ of chordates, as determined by local destruction; (3) the reactions of organisms to solutions, considered from the standpoint of the chemical theory of dissociation.

AN International Maritime Congress will be held at Monaco on April 12–15, under the presidency of M. J. Charles-Roux. The congress will discuss, among other questions, those of assistance to the shipwrecked, the international unification of coast-lights and buoyage, maritime meteorological observations, wireless telegraphy, marine pigeon-post, international maritime tribunals, and a scheme for the creation of a permanent international maritime bureau. The last-named project aims at the international discussion of maritime questions by a permanent and official body.

THE Director of the Missouri Botanic Garden has recently called attention to the facilities offered by that institution for botanical research. The garden owes its foundation to the munificence of Henry Shaw, and the good work which he inaugurated has resulted in the formation of a splendid collection of plants in the garden and in the herbarium, together with

an adequate library without which they would lose much of their value. The collection of books is especially rich in systematic works, and thus affords opportunities for study of the American flora and of its relations with that of other countries. The Director, Dr. Trelease, extends also a courteous invitation to those who may desire to make use of the collections for physiological or other objects, suggesting that provision may be made to suit the requirements of those who desire to engage in such investigations. The growing prominence which is being given to research, and the spirit which impels it, affords one of the surest guarantees for greatness of the intellectual and material future which lies before a strong and virile community.

THE Brussels Academy of Sciences announces the following prize subjects for 1901:—New researches upon the compounds formed by the halogens between themselves (800 francs); the determination of the form of the principal terms introduced into the formulæ of nutation in obliquity and longitude by the elasticity of the earth's crust (800 francs); historical and critical discussion of Weber's experiments on unipolar induction, and new experiments bearing upon the laws and interpretation of this physical fact (800 francs); a contribution to the study of mixed forms with a number of series of variables, and the application of the results to the geometry of space (600 francs); history of researches on the variation of latitude, and a discussion of the interpretations of this phenomenon (600 francs); investigations of the physiological rôle of albuminoid substances in the nutrition of animals or plants (800 francs); new researches on the organisation and development of Phoronis, and the relations existing between the animals Rhabdopleura and Cephalodiscus, and the class to which the name Enteropneusta has been applied (1000 francs); description of simple substances, sulphates and binary compounds of Belgian soil (800 francs); researches on the influence of external factors on karyokinesis and cellular divisions in plants (800 francs).

THE expeditions which will start for the Arctic regions during 1901 are described in the U.S. *Monthly Weather Review* as follows:—(1) The Zeigler-Baldwin, to be led by Mr. Evelyn B. Baldwin, who lately resigned from the Weather Bureau for this purpose, the funds to be contributed by Mr. William Ziegler, of New York. (2) A Russian expedition, commanded by Vice-Admiral Makaroff, in a vessel constructed to push its way through ice fourteen feet thick. (3) A Canadian expedition, in charge of Captain Bernier, in the *Scottish King*. (4) A German expedition, plans not yet published. (5) A joint expedition by Dr. Nansen and the Duke of the Abruzzi. (6) Peary and his companions will finish the exploration of Grinnell Land and return home. (7) Dr. Robert Stein and his companions will complete the exploration of Ellesmere Land. (8) A relief expedition to Franz Josef Land, under the command of Captain Stocken, and apparently at the joint expense of Nansen and Abruzzi. (9) Baron Toll will send a party from the Kara Sea eastward along the Siberian coast. Captain J. E. Bernier, of Quebec, proposes to travel by the route taken by the wreck of the *Jeannette*, with dogs, reindeers, and sledges, over the ice from the Lena or Bennett Island region. The trip may last two and a half years.

ON Tuesday next, April 16, Dr. Allan Macfadyen will deliver the first of a course of six lectures at the Royal Institution on cellular physiology, with special reference to the enzymes and ferments. On Thursday, April 18, Mr. Roger Fry will begin a course of two lectures on naturalism in Italian painting, and on Saturday, April 20, Mr. John Young Buchanan will deliver the first of a course of three lectures on climate: its causes and its effects. The Friday evening discourse on April 19 will be delivered by Prof. J. J. Thomson, his subject being "The Existence of Bodies smaller than Atoms."

THE dispute between the London United Tramways Company and the authorities of Kew Observatory has at last been settled. The tests made at the Board of Trade trial, referred to in our issue of March 21 (p. 499), having shown that the electrical working of the tramway from Hammersmith to Kew will interfere with the magnetic work done at the Observatory, the Tramways Company have agreed to pay a considerable sum towards the cost of removing the instruments to some more suitable site. The electric cars have in the meantime started running. The cars, which are much superior to the old horse trams in comfort, run smoothly and rapidly, taking about five and twenty minutes over the journey from Hammersmith to Kew. The overhead wires, though they certainly do not improve the appearance of the street, cannot be said to be excessively ugly; even at Young's Corner, Chiswick, where the branch line runs off to Shepherd's Bush, and where, consequently, the number of wires is considerable, the effect is not so bad as to be an eyesore. The route, leading direct to Kew Gardens, is a popular one with Londoners anxious to get into the country, and they seem already to appreciate the benefit of the electric trams; it is to be hoped that the system will undergo rapid expansion and extension and give Londoners a cheap, quick and easy method of getting really out of the town.

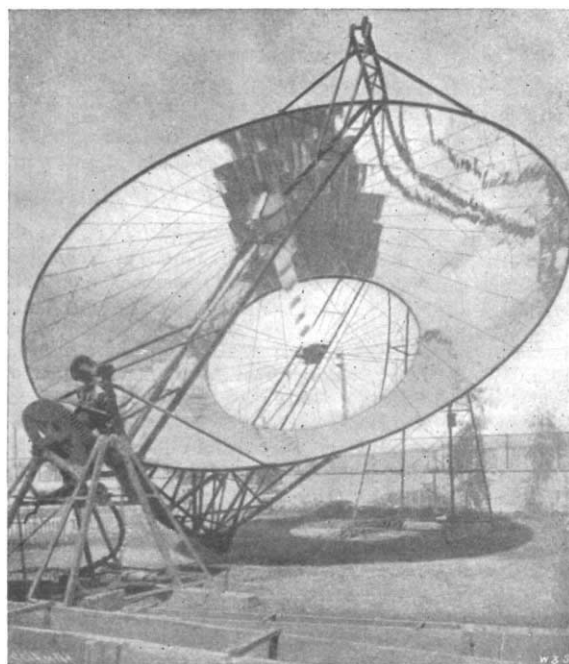
WE have received a copy of *Traction and Transmission*, a monthly supplement to *Engineering*, which makes its first appearance this month. Although the multiplication of technical journals is not a thing to be indiscriminately encouraged, the possibility of keeping pace with all the modern papers becoming daily more difficult to the engineer, there can be no doubt there is ample room at the present time for a magazine devoted to these subjects. England has been at last obliged to set itself seriously to the consideration of the means of relieving the overcrowding and congestion of traffic in the large towns, and the appearance of this paper, at a moment when the attention of every one is being directed to big schemes for traction and the transmission of power, is therefore very opportune. The first number, which is almost wholly devoted to electric traction, contains, amongst many others of great interest, articles on the standardisation of electrical apparatus, by Mr. H. F. Parshall, on the conveyance of goods on electric trolley lines, by Mr. A. H. Gibbings, and on the much vexed question of the education of the electrical engineer, by Mr. R. A. Raworth. The paper is got up in sumptuous style, being printed in very large type on extra thick paper and illustrated by a number of capably-executed plates and diagrams.

THE U.S. *Monthly Weather Review* for December last contains the report of an interesting investigation by Dr. O. L. Fassig on the relation between summer and winter temperatures, with the view of finding, for instance, whether an extremely hot summer precedes a cold winter. The basis of the investigation was an accurate daily record of weather from 1817 to the present time. The investigation shows that neither warm nor cold summers have any more relation to the succeeding winter temperatures than the normal summers have, and that, generally speaking, there is no regular alternation or period in atmospheric temperatures.

The Summary of the Weekly Weather Report for the year 1900, published by the Meteorological Council, contains the mean values of rainfall and temperature for the principal wheat-producing and grazing districts of the British Islands for each five years of the thirty-five yearly period, from 1866 to 1900. The rainfall for the British Islands generally in the year 1900 was 3.7 inches above the average for the whole period. The greatest excess was 16.3 inches in the west of Scotland; in the north of Scotland the excess was 10.2 inches, and in the south

of Ireland 7.9 inches. The only districts in which there was a deficit were the east and south of England, being 1.3 inch in both cases. The driest year, for the whole kingdom, was 1887 (25.8 inches), and the wettest 1872 (49.1 inches). The mean temperature during 1900 was, on the whole, 0.4 in excess of the average, the greatest departures being +1° in the east and south of England. The coldest year was 1879 (46.2) and the warmest 1868 (50.4) for the British islands generally.

AT South Pasadena, California, the large reflector shown in the accompanying illustration, from the *Scientific American*, has been erected, and the solar rays concentrated by it are utilised to produce steam in a boiler at 150 lbs. pressure and drive a motor of fifteen horse-power. The reflector is 36 feet 6 inches in diameter at the top and 15 feet at the lower part. The inner surface is made up of nearly eighteen hundred small mirrors, all arranged to bring the sun's rays to one focus, at which spot a boiler 13 feet 6 inches in length and holding one hundred gallons of water is suspended. The reflector is mounted upon the same principle as that adopted for large telescopes, and is kept facing



the sun by a driving clock. The steam from the boiler is carried to the engine by means of a flexible phosphor-bronze tube, and returns from the condenser to the boiler, so that the water supply in the boiler is kept up automatically. The temperature at the focus of the reflector is sufficient to melt copper, and a pole of wood thrust into it burns like a match. The motor is used to pump water from a well and appears to work satisfactorily. As the skies of Southern California are remarkably free from clouds, and millions of square miles of arid lands are only awaiting the flow of water to be converted into fertile tracks, the solar motor may provide a practicable means for pumping the water and thus leading to the development of the country.

FOR sixty-seven years the Royal Observatory of Belgium has published an *Annuaire* dealing both with astronomy and meteorology, but from the present year each of these services has its own *Annuaire*. Twenty years ago M. Houzeau made a separation of these sciences, so far as the *Annales* are concerned; the division is now complete in everything except the administration. The *Annuaire Meteorologique* for 1901 contains a large

amount of useful information, including the average mean temperature and the mean maximum and minimum temperature at Brussels (or Uccle) for each day of the year, and the monthly means and extremes of all the principal meteorological elements since 1833. There are several articles of special interest, including one by M. J. Vincent on the history of meteorology in Belgium from the earliest times until the establishment of the Academy of Sciences at Brussels in 1773. The next *Annuaire* will continue the sketch from the creation of the Academy until the foundation of the Royal Observatory in 1833.

THE Committee of the Bristol Museum record in their annual report the extensive operations carried on at Brislington, near Bristol, where the remains of a Roman villa have been found. The extensive foundation walls of the villa were laid bare, showing the plan of its construction and many of its domestic features. In addition to two fine mosaic pavements, a great variety of relics of the Roman period were discovered.

THE "Physical Geography of the Texas Region," by Mr. Robert T. Hill, forms Folio 3 of the Topographic Atlas of the United States, issued by the U.S. Geological Survey (1900). It is a finely-printed work, illustrated with numerous maps and beautiful photographic representations of topographic forms, mountains, plains and scarps, rivers and canyons. In the descriptive text the author deals, for the most part, concisely with his subject, showing, first of all, the relations between the geological formations and the scenery, and then describing the principal features.

THE Maryland Geological Survey, which is under the direction of Dr. Wm. Bullock Clark, has just commenced the issue of a series of reports on the physical features of the counties of Maryland. The first report on Allegany County may be taken as a sample of what can be done by an energetic and well-equipped staff. It occupies 323 pages, is printed in remarkably clear type, and is illustrated with numerous diagrams, pictorial views and maps. Accompanying it is a folio atlas, with a colour-printed geological map on a scale of 1 inch to a mile, and other topographic maps. Many experts aid in the descriptions of various subjects, such as physiography, stratigraphy, mineral resources, soils, climate, hydrography, forestry, and fauna and flora. The county, indeed, is one highly favoured, few regions being more salubrious or more picturesque. Along its full length from east to west the Potomac River meanders through a district of rich farming lands and wild mountain scenery. Silurian, Devonian, Carboniferous, Permian and Pleistocene formations are met with, and the history of research among these strata is fully recorded. The leading characters and many details concerning the formations are given, though with too scant particulars of the fossils to please those who seek comparisons with equivalent strata elsewhere. The rocks grouped as Permian follow the Carboniferous conformably. They comprise shales and limestones with unimportant sandstones and coal-beds, and their fossils have yet to be described. To those residing in Allegany County this admirable memoir cannot fail to be of the greatest interest and service.

THOSE who have visited the Bankfield Museum at Halifax are aware of the improvements effected in the ethnographical section by the untiring industry of Mr. H. Ling Roth, the honorary curator, who has, in addition, just issued a pamphlet on the Fijian Collection. This excellent little guide of twenty-seven pages contains forty-four illustrations, mostly of specimens in the collection. It forms an interesting sketch of Fijian ethnography, written with that carefulness of detail which students have learnt to expect from Mr. Ling Roth. As coloured designs on bark cloth are found in some parts of New Guinea where

direct Polynesian influence is entirely out of question, there seems no reason to believe, as Mr. Ling Roth suspects, that Fijian *masi* or *tapa* is a "Polynesian institution introduced among this Melanesian people." The same argument applies, though perhaps not so conclusively, to tattooing.

WHERE the Thompson and Fraser rivers meet at Lytton in Southern British Columbia has always been an important site of the Indians, as the ancient burial grounds and village sites testify. The late Dr. G. M. Dawson first described the remains in 1891, but recently the Jesup North Pacific Expedition made a series of explorations in this vicinity, of which an abstract has been described by Harlan J. Smith in the *Memoirs of the American Museum of Natural History*, vol. ii. part iii. (*Monumental Records*). The prehistoric culture resembles that of the present inhabitants of the interior of British Columbia. The mode of life of the prehistoric tribes, their utensils and even their customs must have been practically the same as those of recent Indians. There are, however, a few slight differences; the ancient type of pipe resembles the prehistoric pipe of Oregon and California, while the recent pipe is practically of the same type as that found on the plains. The potter's art was then, as now, unknown. On the whole the prehistoric culture of the interior of British Columbia shows greater affinity to that of the western plateaus than to that of the North Pacific coast.

MR. C. D. CHILD, writing in the *Physical Review* for February, describes some experiments made with the new method for determining the velocity of ions, recently suggested by Prof. J. J. Thomson. The method in question "is to produce the ions in one region and measure the electrical intensity at two points where there is no production of ions, but to which ions of one sign only can penetrate under the action of the electric field." The author shows by an application of Prof. Thomson's method that the velocity of the positive ions drawn from a Bunsen burner is approximately 2.2 cm. per sec. for potential gradient of 1 volt per cm., and that for negative ions 2.6 cm. Further, in the case of an unlimited supply of ions, if the discharge takes place between two regular surfaces, the velocity may be determined by simply measuring the current per unit area and the difference of potential between these surfaces, and if the surfaces are not at all regular the relative velocities of the positive and negative ions may be determined by comparing the positive and negative currents.

IN a paper on stationary motions, published in the *Atti dei Lincei*, x. 5, Signor T. Levi-Civita has endeavoured to furnish a more precise definition than commonly exists of the conception of stationary motion. Routh's definition, taken in its purely formal aspect, leads to the conclusion that by a proper choice of variables any motion may be regarded as stationary. On the other hand, experience teaches us that certain motions possess peculiar characters of simplicity and regularity which distinguish them clearly from other motions, and, moreover, Routh's examples show that in certain cases his definition actually does distinguish stationary motions (in the physical sense) from non-stationary motions. The author considers that the distinguishing characteristic in such cases is that the integrals or invariable relations which determine stationary solutions are always *uniform* in the sense considered by Poincaré. According to Routh, a stationary motion \mathfrak{Z} is characterised by the property that if the conditions are equally modified at any two instants, t' , t'' , the disturbed motions \mathfrak{Z}' , \mathfrak{Z}'' present relations such that under a certain condition they may be regarded as equivalent. Now Signor Levi-Civita considers that an analytical condition which is not uniform has no physical interest, and he is of opinion that Routh's definition of stationarity should be completed by adding the proviso that the relations between two disturbed motions, \mathfrak{Z}' , \mathfrak{Z}'' , should be uniform. As an example,

it follows that the problem of n bodies does not admit of any forms of motion absolutely stationary beyond the particular solutions of Laplace, in which the bodies rotate uniformly, maintaining an invariable (plane or rectilinear) configuration. On the other hand, the chief problems of ordinary dynamics conform to the property in question.

WE learn from the April number of the *Entomologists' Monthly Magazine* that the late Mr. Lennon's collection of British Coleoptera has found a permanent home in the Edinburgh Museum of Science and Art. Its richness may be gathered from the circumstance that the number of species from the Solway district alone is estimated at more than twelve hundred.

IN addition to several papers dealing with abnormalities in human anatomy and others on ethnology, the *Proceedings* of the Anatomical and Anthropological Society of the University of Aberdeen for 1899-1900 contains an abbreviated report of a lecture delivered before the University by Dr. A. Keith, on the relations of man to the higher Primates. The lecturer expressed his opinion that the gorilla and chimpanzee are co-descendants of an early Miocene anthropoid, for which the name *Protrolodytes* was suggested. It was estimated that more than five million years have elapsed since the separation of the human stock as a distinct form.

THE osteology of the woodpeckers forms the subject of a paper by Dr. R. W. Shufeldt in the October-December issue of the *Proceedings* of the American Philosophical Society. As the result of his investigations, the author concludes that these birds are more nearly related to the Passeres than to any other group, and that both are probably divergent branches of a single ancestral stock. In a second communication to the same journal, Dr. Shufeldt treats of the skeleton of the owls, and arrives at the conclusion that there is no marked affinity between that group and the diurnal birds of prey. Rather, he thinks, there is a relationship, although a remote one, between the owls and the nightjars, the South American oil-bird (*Steatornis*) and the Australasian *Podargus* being the members of the latter group in which the evidence of strigine affinities is most conspicuous.

THE journal last quoted also contains an interesting communication by Mr. R. H. Mathews, dealing with the origin and customs of the Australian aborigines. It is argued that the Australians reached their present home by way of the Malay Islands, but that the immigration has taken place at more than one epoch, the later immigrants being of a higher grade than their predecessors. The earlier immigrants are considered to have been of the Melanesian type, and their unmodified descendants were the now extinct Tasmanians. The later invaders, on the other hand, never reached Tasmania, which had, at the time of their arrival, become insulated. "There is nothing unreasonable," adds the author, "in the assumption that these invaders and the native tribes of the southern portion of India are the descendants of a common stock—the Australians, owing to their long isolation, having retained the primitive character of their Neanderthaloid ancestors, while the later Indian tribes have attained a higher grade of evolution." Possibly this may be the real solution of an extremely puzzling ethnological problem.

THE *Century Magazine* for April contains an excellent and fully illustrated popular account, by Dr. L. O. Howard, the chief entomologist of the U.S. Department of Agriculture, of the recent investigations connecting the propagation of malaria with mosquitoes of the genus *Anopheles*. The author first of all dwells upon the great prevalence of malaria in certain parts of the world. Although in temperate regions the mortality from this disease is not high, in one year in the United States

the deaths due to malarial fever were 3976 per 100,000, and in a later year 2673 per 100,000. In Italy the average death-rate from this cause is 15,000 annually, while in India five million deaths were ascribed to "fever" in 1892, and in Italy two million persons suffer annually in one way or another from malaria. The malaria-producing species are then described, after which comes a description, with illustrations, of the development of the malaria-parasite in the red blood corpuscles and in the body of the *Anopheles* mosquitoes. The article concludes with a brief reference to the evidence now being collected to connect yellow fever with a mosquito. Instead of belonging to *Anopheles*, the suspected insect pertains to the genus *Culex* (or perhaps represents a genus by itself); and it is considered probable, if the suspected connection between this insect and yellow fever be verified, that the fever germ will prove to be a protozoon, that is to say, an animal, and not a bacterion or vegetable organism. The experiments in question were made during last summer and winter by the U.S. Army surgeons in the hospitals at Cuba; and they tend to show with a reasonable degree of certainty that mosquitoes which have bitten patients suffering from yellow fever may, and do, convey the disease by biting healthy persons.

WE have received the annual report of the Indian Museum, Calcutta, for the year ending March 31, 1900, and are pleased to learn that considerable progress has recently been made in the development of that institution. Owing to the removal of the offices of the Geological Survey to another building, four additional galleries are available for exhibition, and the superintendent, Major Alcock, reports that three of these have been already opened to the public. They have respectively been filled with reptiles, fishes and insects, arranged with special regard to the requirements of the student of the Indian fauna. The transfer of these specimens has allowed a much-needed expansion of some of the other groups. A very large proportion of the work of the staff has, indeed, been devoted to the improvement and rearrangement of the exhibition series, which, as the superintendent remarks, is that portion of the museum whereby progress is gauged by the public, and where the influence of the museum is most exerted. It may interest museum officials in this country to learn that most of the fishes in the Indian Museum are now coloured in imitation of their natural tints and that a large proportion of the reptiles and amphibians are represented by coloured clay models. Almost the only thing that Major Alcock has to lament is the circumstance that the post of naturalist to the surveying ship was vacant during the greater part of the year, in consequence of which the museum's list of acquisitions fell much below the normal.

THE second part of a bibliography, guide and index to bacteriological literature, belonging to vol. i. (*Bacteria*) of "The Scientific Roll" has been received. The magazine, which is conducted by Mr. Alexander Ramsay, contains lists of papers published from 1876 to 1892 (both inclusive), arranged in each year alphabetically according to authors' names.

A NEW edition (the third) of Mr. W. W. Rouse Ball's inspiring "Short account of the History of Mathematics" has been published by Messrs. Macmillan and Co., Ltd. The work originally appeared in 1888 and was described in detail in these columns (vol. xxix. p. 265). The present edition has been revised but not materially altered.

FOUR parts of the first volume of *Proceedings* of the University of Durham Philosophical Society, containing papers brought before the Society in the years 1896-1900, have been received. As a record of the Society's contributions to knowledge during the first four years of its existence, the *Proceedings* are very creditable. Many of the papers contain the results of

research, and others deal with various aspects of science descriptively. Such a society is a centre of beneficial influence, for it encourages investigation, affords facilities for the communication of facts and ideas, and promotes the friendly intercourse which broadens the views and sympathies of workers in different fields.

INCREASING interest in physical chemistry is shown by the fact that Prof. Walker's "Introduction to Physical Chemistry" (Macmillan), which was published towards the end of 1899, is already in its second edition. The book, which contains a full discussion of the chief principles of modern physical chemistry and shows their application to ordinary laboratory chemistry, has already been noticed in these columns (vol. lxii. p. 76, May 1900). Among other new matter in the new edition are accounts of "Berthelot's method for determining exact molecular weights from the limiting densities of gases, Traube's volume researches, and the position of the recently-discovered atmospheric gases in the periodic system."

IN the current number of the *Berichte*, Messrs. Pictet and Rotschy give an account of the isolation of three new alkaloids from tobacco. Up to the present only a single organic base, nicotine, has been found in tobacco. In most plants producing alkaloids several bases usually occur together, and as it appeared unlikely that the tobacco plant should prove exceptional in this respect, a large quantity of tobacco extract was worked up, with the result that three new bases were discovered, to which the names nicotine, nicotellin and nicotimin are given. Of these, the last is associated with the crude nicotine, with which it is isomeric, differing, however, in being a secondary base and forming a nitrosamine by means of which it can be separated from the nicotine, in spite of the fact that it is present in very small amount in the crude base. The nicotine contains two atoms and the nicotellin four atoms of hydrogen less than nicotine.

THE additions to the Zoological Society's Gardens during the past week include a Patas Monkey (*Cercopithecus patas*) from West Africa, presented by Mr. H. Plange; a Diana Monkey (*Cercopithecus diana*) from West Africa, presented by Mrs. Yorke; a Bonnet Monkey (*Macacus sinicus*) from India, presented by Mr. W. K. Edwards; a Common Otter (*Lutra vulgaris*), British, presented by Mr. W. Radcliffe Saunders; a Maximilian's Aracari (*Pteroglossus weddi*) from Brazil, presented by Mrs. J. Rose; a Common Viper (*Vipera berus*), British, presented by Mr. G. Leighton; two Spanish Cattle (*Bos taurus*) from Spain, a Black-faced Kangaroo (*Macropus melanops*) from Tasmania, a Yellow-footed Rock Kangaroo (*Petrogale xanthopus*) from South Australia, a Grevy's Zebra (*Equus grevyi*) from Southern Abyssinia, three Zebras (*Bos indicus*) from India, two Nubian Goats (*Capra hircus*) from Nubia, five four-horned Sheep (*Ovis aries*) from St. Kilda, two Somali Ostriches (*Struthio molybdophanes*) from Somaliland, deposited; a Kestrel (*Tinnunculus alaudarius*), British, presented by Mr. F. Layer.

OUR ASTRONOMICAL COLUMN.

THE SPECTRUM OF NOVA PERSEI.—Prof. Vogel, in a recent communication (*Sitzber. d. k. Akad. der Wiss. zu Berlin*, March 21, xvi.), gives the results of a discussion of the Potsdam observations of Nova Persei. Prof. Vogel considers that the spectrum can only be explained on the hypothesis of Wilsing. The immense perturbations in the star give rise to great differences of pressure in the layers of the materials composing the Nova, and these differences account not only for the presence of the bright and dark lines, but their great breadth. Prof. Vogel does not think that there is any reason to assume that the apparent great displacement of the dark lines is the consequence of a large motion deduced on the principle of

Doppler. This displacement he accounts for on the supposition of the overlapping of the broad dark band over the bright band, the great pressure of the substance giving the bright band being more strongly developed on the red side, thus allowing the dark band to appear more prominent on the violet side.

STONEHENGE AND OTHER STONE CIRCLES.

TWO interesting papers on stone circles, by Mr. A. L. Lewis, have recently been published by the Anthropological Institute. One dealing more particularly with the stone circles of Scotland occurs in the *Journal of the Institute* (vol. xxx. New Series, vol. iii. 1900), and the other, on the damage recently sustained by Stonehenge, appears in *Man*—the monthly record of anthropological science published under the direction of the Institute. We reprint the latter paper, with the two illustrations accompanying it, and are glad to acknowledge the courtesy of the Institute in permitting us to do so. And here it will not be out of place to remark that both the *Journal* and *Man* are full of papers and notes of interest to every one devoted to the study of the human race in its many aspects. When one considers how little encouragement is given to the science of anthropology in this country, it is really astonishing to see the large amount of excellent material published under the auspices of the Anthropological Institute. The U.S. Bureau of Ethnology have funds to publish magnificent volumes showing the results of ethnological investigations carried on by its officers, but here there is no similar department for the preparation and distribution of such contributions to science, and anything that is done represents the result of private efforts for the advancement of natural knowledge. Even if no assistance is given to systematic anthropological inquiries in our colonies and dependencies, every facility ought to be provided for the publication of facts obtained by observers interested in the characteristics and customs of the races of men.

Mr. Lewis describes, in the *Journal* already mentioned, the observations made by him of stone circles in various parts of Scotland. The condition of some of these monuments of antiquity is deplorable, many of the stones having been shifted and used for all kinds of purposes. At Clava, for instance, we notice that one stone has been shifted to be parallel with a road running across the circle, and another has been placed to form the end of a stone wall. From an examination of a large number of stone circles in Scotland, Mr. Lewis concludes that they may be divided into different types each of which has its centre in a different locality. The types are (1) the Western Scottish type, consisting of a rather irregular single ring or sometimes of two concentric rings. (2) The Inverness type, consisting of a more regular ring of better-shaped stones, surrounding a tumulus with a retaining wall, containing a built-up chamber and passage leading to it, or a kist without a passage. (3) The Aberdeen type, consisting of a similar ring with the addition of a so-called "altar-stone" and usually having traces of a tumulus and kist in the middle. There is reason to believe that most of the circles of these three types were used for burial, if, indeed, that were not their chief purpose, but as there is evidence that all have not been so used, it cannot have been their only purpose. In addition to these three types of circles, there are what Mr. Lewis calls sun and star circles, with their alignments of stones, and apparently proportioned measurements. The stone circles of England appear to refer to the sun and stars more frequently than those of Scotland, where, however, more similar circles may yet be found. The Stonehenge group of stones seems almost to form a class by itself, and Mr. Lewis's description of it, reprinted below from *Man*, describes the present condition of this unique monument.

"The end of the nineteenth century has been signalised by—amongst other things—the fall of a part of Stonehenge, a misfortune which may not be without its compensating advantage if it should be the cause of the necessary measures being taken to preserve what is left of this unique monument in an intelligible condition.

"Stonehenge, it will be remembered, consists of a number of comparatively small stones standing in the form of a horse-shoe with the open end to the north-east, outside which were five "trilithons," or sets of two upright stones, each supporting a huge cross-piece; these were the largest stones of all, and only two sets of them remain complete, the last great change at